Notes - Solutions by Factoring + the Zero Product Property

- In the space to the right, state what happens in each step + why.

Ex 1: $x^2 + 5x + 6 = 0$

$(x+2)(x+3) = 0$ ______________________ (what?)

So, either $(x+2) = 0$ ______________________ (what?)

or $(x+3) = 0$ ______________________ (why?)

$$\begin{array}{l} x+2=0 \\ \quad -2 \quad -2 \\ \hline x=-2 \end{array} \qquad \begin{array}{l} x+3=0 \\ \quad -3 \quad -3 \\ \hline x=-3 \end{array}$$ ______________________ (what?)

$x = -2$ and -3

Ex 2: Find the solutions of $4x^2 + 16x = 0$

$4x(x+4) = 0$ ______________________ (what?)

So $\frac{4x}{4} = \frac{0}{4}$ or $x + 4 = 0$ ______________________ (what?)

$\quad -4 \quad -4$ ______________________ (what?)

$\boxed{x = 0 \text{ and } x = -4}$

Ex 3: Find the solutions of $x^2 - 4x = 12$

$x^2 - 4x - 12 = 0$ ______________________ (what?)

______________________ (why?)

$(x-6)(x+2) = 0$ ______________________ (what?)

so $x - 6 = 0$ or $x + 2 = 0$ ______________________ (what?)

$\boxed{x = 6 \text{ and } x = -2}$ ______________________ (what?)

Based on the three examples, find some patterns.

- Before you can factor, what do you need to make sure the equation is equal to? Why?

- What do you do right after you factor? Why do you think this is called using the "zero product property"?

- What is the last step in this method of solving by factoring?

Now You Do!

1) $x^2 + 7x + 10 = 0$

2) $3x^2 = 10x$